INSTRUCTIONS

-J04961 REV. 2014-08-26

SCREAMIN' EAGLE TWIN CAM 110 (1800 CC) CONVERSION KIT

GENERAL

Kit Number

27501-10A, 27504-10A

Models

For model fitment information, see the P&A Retail Catalog or the Parts and Accessories section of www.harley-davidson.com (English only).

Installation Requirements

This kit requires the separate purchase of the Cam Drive Retention Kit (25566-06) which is available from a Harley-Davidson dealer.

The separate purchase of Crankcase Boring Tool Kit (94419-06) is recommended for installing this high performance engine conversion kit.

NOTE

Crankcase Boring Tool Kit (94419-06) includes a modified top center screw (1093) to verify the crankcase boring tool does not get damaged when installing the conversion kit. This screw can also be purchased separately from a Harley-Davidson dealer for installers who wish to use their own boring fixture.

See appropriate sections in service manual for the special tools required to install this kit.

Proper installation of this kit also requires the use of Digital Technician™ at a Harley-Davidson dealer.

⚠WARNING

The rider's safety depends upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333a)

NOTE

This instruction sheet references service manual information. A service manual for your model motorcycle is required for this installation. One is available from a Harley-Davidson dealer.

Kit Contents

See Figure 4 to Figure 7 and Table 2 to Table 5.

NOTES

Installation of this kit by an authorized Harley-Davidson dealer will not impact your limited vehicle warranty.

The kit is intended for High Performance applications only. This engine-related performance kit is legal for sale or use in select countries or regions on pollution controlled motor vehicles. Check with your local Harley-Davidson dealer for compliance requirements in your area.

A new partial emissions tune-up label is included as a requirement of the California Air Resource Board (CARB)/EPA emissions regulation. Place the new partial label over the upper part of the original emissions tune-up label.

REMOVAL

Prepare for Service

1. Raise the motorcycle.

NOTE

Disarm security system.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

2. Disconnect negative battery cable.
3. Remove seat according to the instructions in the service manual.
4. Refer to service manual to remove left saddlebag and side cover.

⚠WARNING

When servicing the fuel system, do not smoke or allow open flame or sparks in the vicinity. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00330a)

5. Remove fuel tank according to the instructions in the service manual.

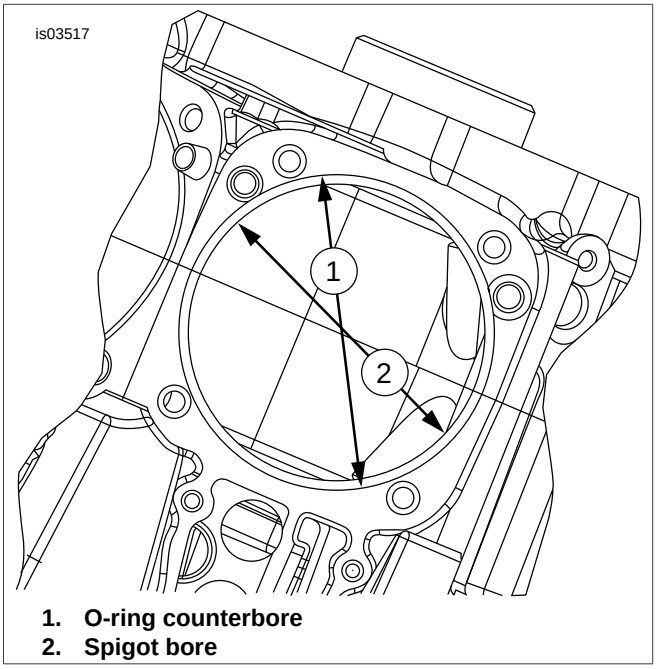
Remove Engine Components

1. Remove existing air cleaner assembly. Refer to service manual.
2. Remove existing exhaust system. Refer to service manual.
3. Remove engine from chassis following the instructions in the service manual.
4. Disassemble engine top end and bottom end. Refer to appropriate sections in service manual.
5. Remove existing clutch diaphragm spring. Refer to service manual.

MACHINE CRANKCASE

NOTICE

The procedures in this instruction sheet should be performed by one experienced in precision measuring techniques. Failure to meet tolerances called for in this instruction sheet can result in engine damage. (00511b)



1. **O-ring counterbore**
2. **Spigot bore**

Figure 1. Spigot Bore and O-Ring Counterbore Dimensions

Table 1. Spigot Bore and O-Ring Counterbore Dimensions

Description	Bore	Depth
Spigot Bore	4.205 +/- 0.010 in. (107 +/- 0.25 mm)	1.625 +/- 0.010 in. (41.3 +/- 0.25 mm)
O-Ring Counterbore	4.415 +/- 0.002 in. (112 +/- 0.05 mm)	0.085 +/- 0.003 in. (2.16 +/- 0.08 mm)

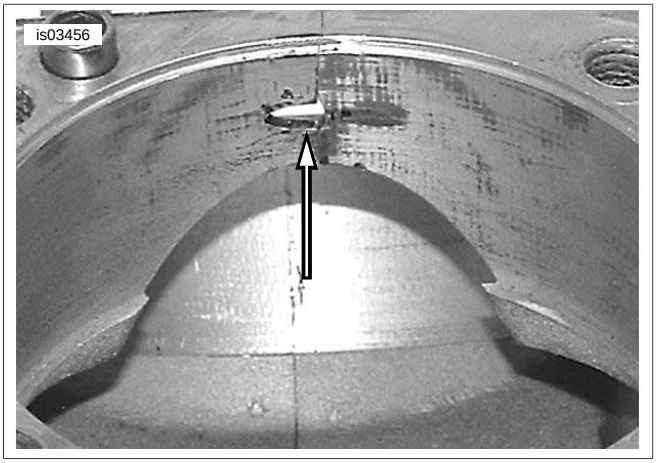


Figure 2. Cylinder Wall

Crankcase Boring Preparation

NOTE

During final reassembly of the engine, Harley-Davidson recommends replacing the Original Equipment cylinder studs with Screamin' Eagle High Tensile Studs (16505-01).

1. Remove cylinder studs from the engine crankcase.
2. Mask off all bearings and oil holes to prevent debris and contaminants from entering those areas.
3. Inspect and clean engine case mating surfaces.
4. See Figure 6. Reassemble engine case with original screws, except the top center screw between the cylinders. Tighten to specifications listed in service manual.

NOTE

To prevent damage to crankcase boring tool, it is important to replace the top center screw with a modified top center screw (1093). This screw is included in the Crankcase Boring Tool Kit (94419-06). One can be purchased separately from a Harley-Davidson dealer.

5. Install modified top center screw (1093) between the cylinders. Tighten to 50-90 **in-lbs** (5.6-10.2 Nm).

NOTE

To aid in crankcase boring, a Screamin' Eagle Crankcase Boring Tool Kit (94419-06) is available. Modified top center screw (1093) is included in this kit. Refer to Harley-Davidson Genuine Motor Accessories and Genuine Motor Parts catalog or Screamin' Eagle Pro catalog.

6. See Figure 1 and Table 1. Machine crankcase cylinder spigot bore and O-ring counterbore to the dimensions shown.

Modify Crankcase

NOTE

To prevent severe engine damage, thoroughly clean and remove all chips and debris from the engine crankcase after boring.

1. Disassemble crankcase and wash (or clean) chips and debris from engine crankcase halves as necessary.
2. See Figure 2. Using a 11/32 in (8.7 mm) drill bit, drill out the existing threads of the top center screw hole. Drill to a depth of 0.79 in (20 mm) from the gasket surface.
3. Using a size "F" in (6.6 mm) drill bit, extend the top center screw hole 1.00 in (25.4 mm) maximum to a depth of 1.79 in (45.5 mm) from the gasket surface.
4. Using a bottoming tap (purchased separately) size 5/16-18 UNC-2B, tap the screw hole to a minimum depth of 1.59 in (40.4 mm) from the gasket surface.
5. See Figure 2 and Figure 3. Remove the thin material between the cylinders next to the top center screw as shown. Use a 5/8 in (16 mm) ball end mill and milling a 5/16 in (7.94 mm) radius at the two points shown.

6. Refer to the appropriate service manual and assemble the engine with the following changes:

- See Figure 6. Install the top center engine crankcase screw (15) supplied in kit but do not tighten.
- Tighten all of the engine crankcase screws to the specified torque, except the top center engine crankcase screw.

NOTE

The cylinder spigot seal is a rectangular O-ring ***Seat the seal at base of cylinder before the cylinder being assembled to the crankcase.*** *Using the crankcase to seat the rectangular O-ring to the base of the cylinder can roll (spiral) the O-ring during assembly. A rolled (Spiraled) O-ring creates a leak path at the cylinder/crankcase interface.*

- After the cylinders and heads have been installed and the hardware tightened to specification, tighten top center engine crankcase screw to 50-90 **in-lbs** (5.6-10.2 Nm)

INSTALLATION

Install Engine and Clutch Components

1. See Figure 6. Inspect camshaft needle bearings (7) and replace if necessary.
2. See Figure 4 through Figure 6. Assemble engine top end and bottom end using parts from kit. Refer to appropriate sections in service manual.
3. Install engine in chassis following the instructions in the service manual.
4. Install clutch diaphragm spring from kit. Refer to service manual.
5. Install exhaust head pipe assembly and mufflers previously removed. Refer to service manual.
6. Install Air Cleaner Kit (29592-05) according to the instructions in the Instruction Sheet.

Install ACR Overlay Wire Harness

See Figure 7. Install the ACR Overlay Wire Harness Kit (70623-06) according to the instructions in the Installation Sheet.

Final Assembly

⚠WARNING

Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

1. Connect both battery cables, positive battery cable first.

NOTICE

You must recalibrate the ECM when installing this kit. Failure to properly recalibrate the ECM can result in severe engine damage. (00399b)

NOTICE

Installation of this kit requires a calibration update using Digital Technician. Failure to download calibration update before starting motorcycle will result in ACR failure. (00567b)

2. Calibrate the ECM before connecting the ACR overlay harness connectors to the ACR solenoids in the cylinder heads.
3. Install fuel tank according to the instructions in the service manual.

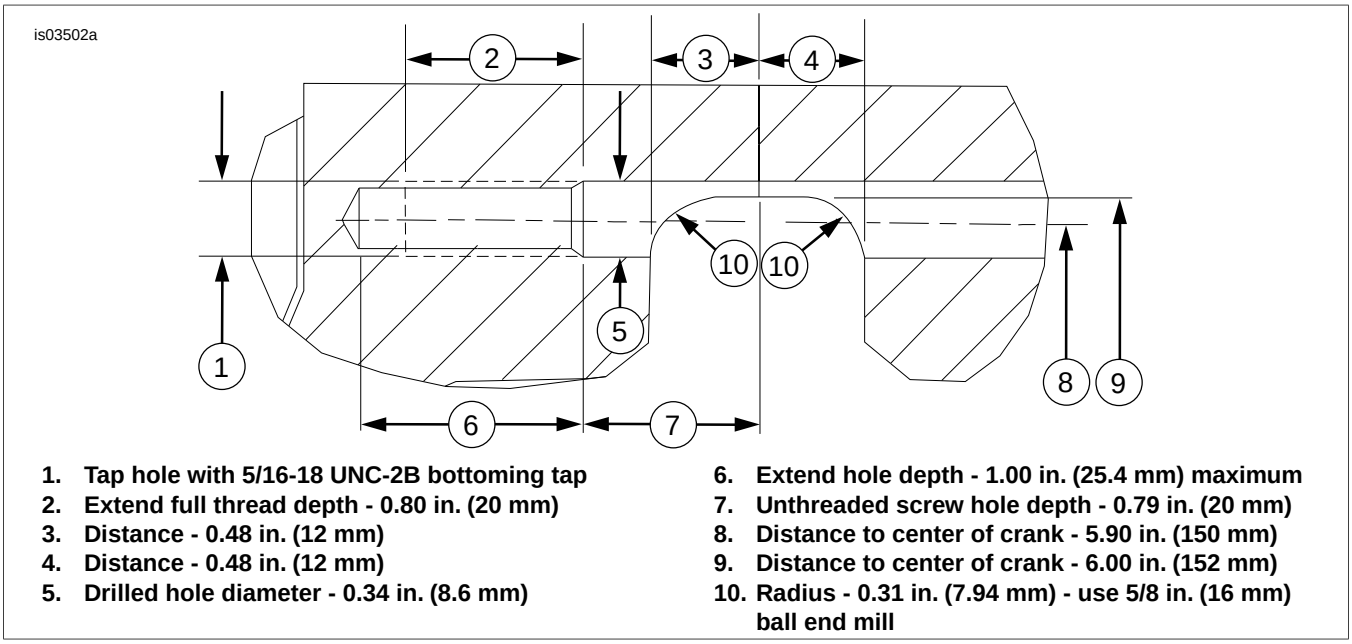
⚠WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

4. Install seat according to the instructions in the service manual.
5. Install left side cover and left saddlebag. Refer to service manual.
6. Start and run engine. Repeat several times to verify proper operation.

Operation

Refer to the owner's manual to break in the motorcycle.



1. **Tap hole with 5/16-18 UNC-2B bottoming tap**
2. **Extend full thread depth - 0.80 in. (20 mm)**
3. **Distance - 0.48 in. (12 mm)**
4. **Distance - 0.48 in. (12 mm)**
5. **Drilled hole diameter - 0.34 in. (8.6 mm)**
6. **Extend hole depth - 1.00 in. (25.4 mm) maximum**
7. **Unthreaded screw hole depth - 0.79 in. (20 mm)**
8. **Distance to center of crank - 5.90 in. (150 mm)**
9. **Distance to center of crank - 6.00 in. (152 mm)**
10. **Radius - 0.31 in. (7.94 mm) - use 5/8 in. (16 mm) ball end mill**

Figure 3. Top Center Engine Crankcase Screw Hole Modification

SERVICE PARTS

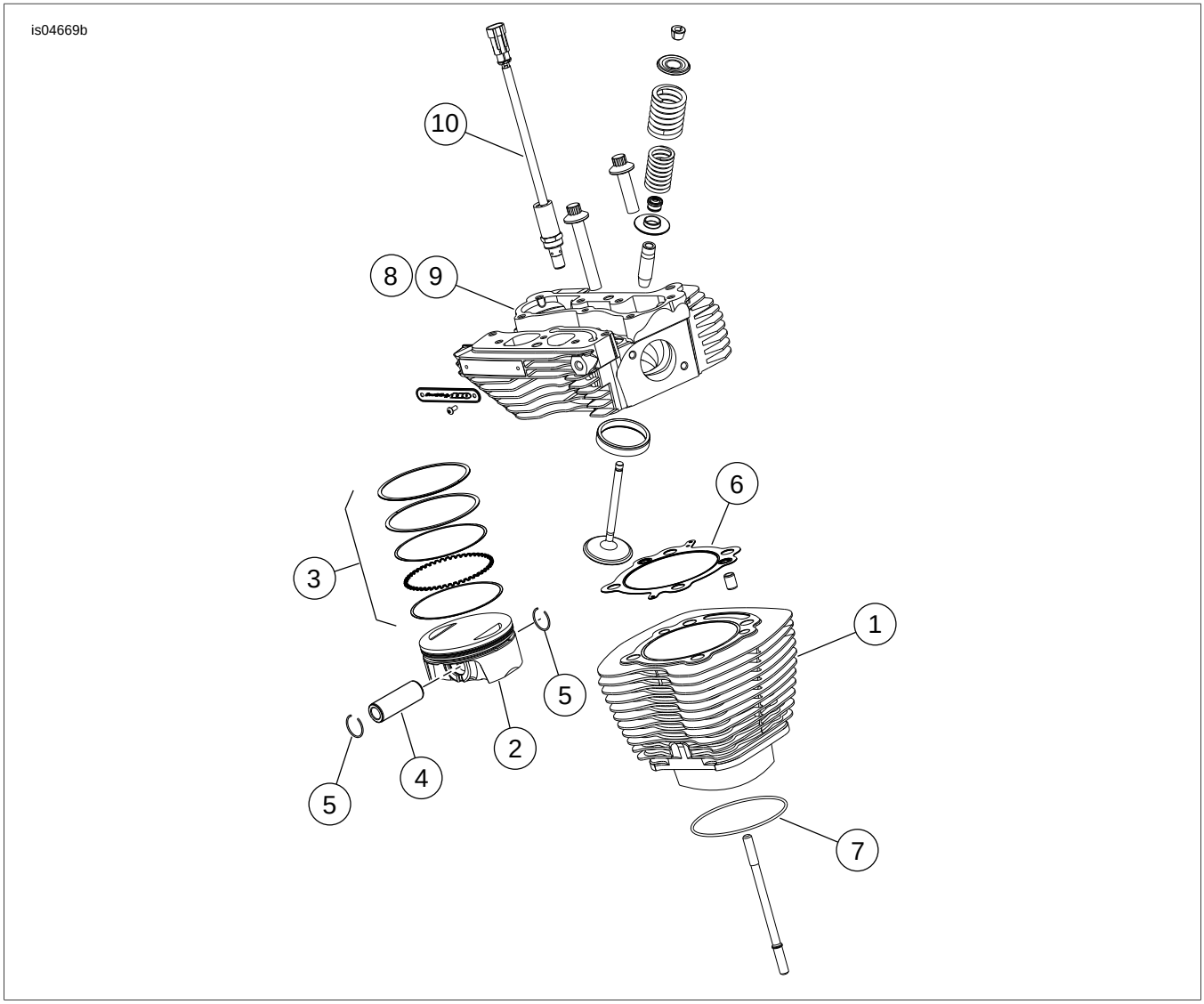


Figure 4. Service Parts: Screamin' Eagle Twin Cam 110 (1800 cc) Conversion Kit

Table 2. Service Parts: Screamin' Eagle Twin Cam 110 (1800 CC) Conversion Kit

Item	Description (Quantity)	Part Number		Item	Description (Quantity)	Part Number
1	Cylinder assembly (Black) (2)	17285-07A		8	Backplate, air cleaner	29764-08A
	Cylinder assembly (Silver) (2)	16815-07A		9	Cylinder head, front (black) (w/ACR)	17288-08A
2	Piston (2)	Not Sold Separately			Cylinder head, front (silver) (w/ACR)	17289-08A
3	Piston Ring Set (2)	21951-11		10	Cylinder head, rear (black) (w/ACR)	17252-07A
4	Piston pin (2)	22269-07			Cylinder head, rear (silver) (w/ACR)	17262-07A
5	Piston pin circlip (4)	22097-99		11	Automatic Compression Release (ACR)	28861-07A
6	Gasket, cylinder head (2)	16801-07C		Notes: Piston Kit (21991-11) includes 2 through 5. Item 5 through 7 are also included in Engine Overhaul Gasket Kit (17350-07B). Refer to 2010 FLHTCUSE5 Parts Catalog (99428-10) for cylinder head assembly (9, 10) components.		
7	O-ring, cylinder spigot (2)	Not Sold Separately				

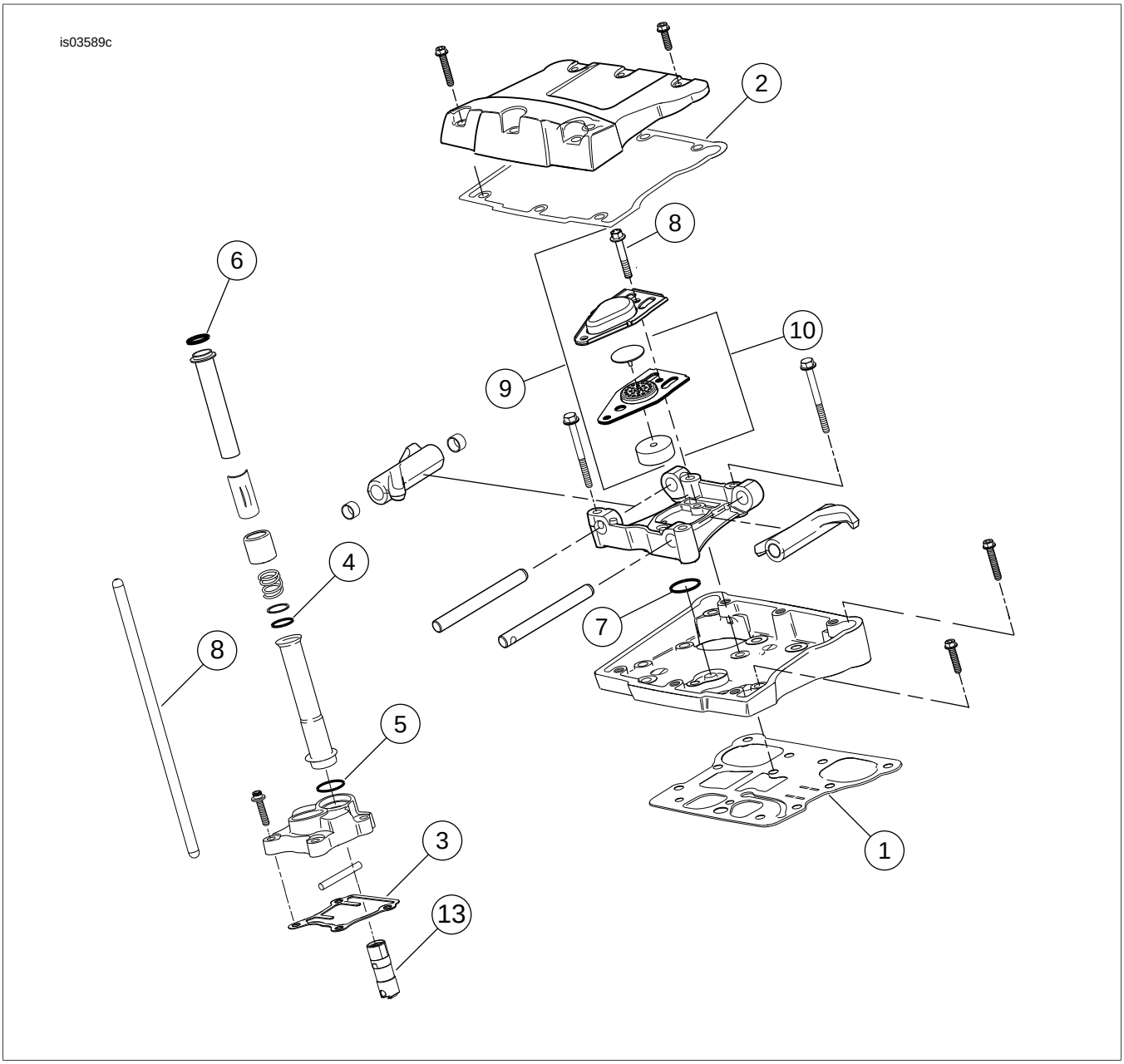


Figure 5. Service Parts: Screamin' Eagle Pro TC 103 (1690 cc) Stage 3 Upgrade Kit

Table 3. Service Parts: Screamin' Eagle Twin Cam 110 (1800 CC) Conversion Kit

Item	Description (Quantity)	Part Number		Item	Description (Quantity)	Part Number
1	Gasket, rocker cover base (2)	16719-99B		9	Breather assembly (2)	17025-03A
2	Gasket, rocker cover top (2)	17386-99A		10	Baffle assembly (2)	26500002
3	Gasket, tappet cover (2)	18635-99B		11	Seal, EFI intake (2)	26995-86B
4	O-ring, middle push rod cover (4)	11132A		12	Spring, clutch diaphragm (2) (Not Shown)	37951-98
5	O-ring, lower push rod cover (4)	11145A		13	High capacity tappet (4)	Not Sold Separately
6	O-ring, upper push rod cover (4)	11293		Notes: Items 1 through 11 are included in Engine Overhaul Gasket Kit (16500228) Item 13 is included in High Capacity Tappet Kit (18572-13).		
7	O-ring, rocker arm support (2)	11270				
8	Breather bolt (4)	4400				

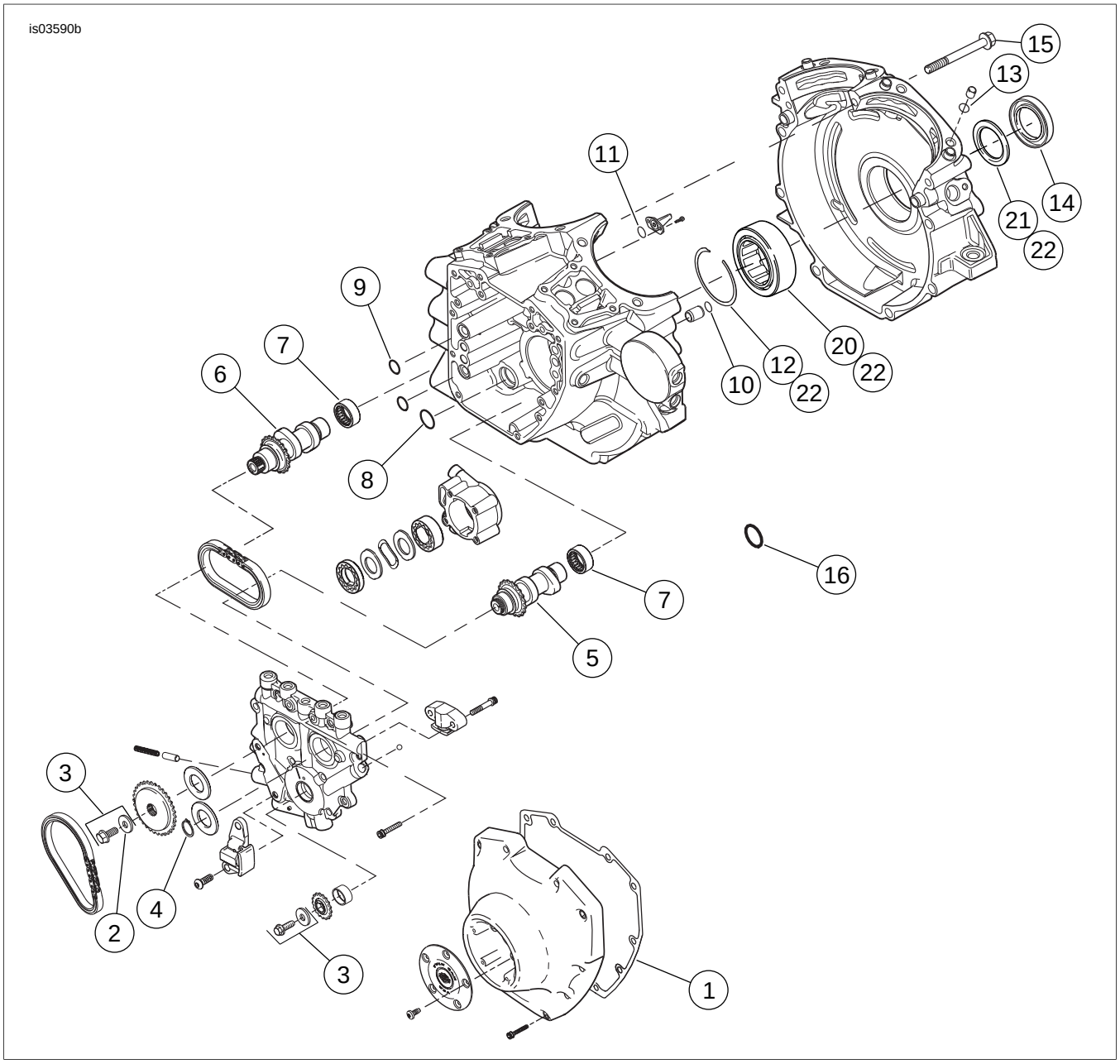


Figure 6. Service Parts: Screamin' Eagle Pro Twin Cam 110 (1800 cc) Conversion Kit

Table 4. Service Parts: Screamin' Eagle Twin Cam 110 (1800 CC) Conversion Kit

Item	Description (Quantity)	Part Number
1	Gasket, cam cover	25244-99A
2	Washer	6294
3	Cam drive retention kit w/6294, screws, and washer	25566-06
4	Retaining ring	11461
5	Camshaft, front	Not Sold Separately
6	Camshaft, rear	Not Sold Separately
7	Bearing, needle (2) (must be purchased separately, if needed)	9215
8	O-ring, oil pump to cam plate	11293
9	O-ring, cam plate to crankcase (2)	11301
10	O-ring, crankcase ring dowel (2)	26432-76A
11	O-ring, piston cooling (2)	11140

Table 4. Service Parts: Screamin' Eagle Twin Cam 110 (1800 CC) Conversion Kit

Item	Description (Quantity)	Part Number
12	Retaining ring, internal	35114-02
13	O-ring, crankcase dowel (2)	Not Sold Separately
14	Seal, main bearing oil	12068
15	Screw, top center crankcase, long	1090A
16	O-ring, CPS (not shown)	11289A
17	Seal, exhaust (2) (not shown)	65324-83B
18	Seal, oil interconnect (not shown) (Softail models only)	45359-00
19	Valve seal (4) (not shown) (not required)	18067-09
20	Bearing, main	24605-07
21	Thrust washer	8972
22	Bearing Kit w/8972, 24607-07, 35114-02, and inner race (not shown)	24004-03B
23	Screw, modified, crankcase boring (Not Shown) (must be purchased separately)	1093
Items 5 and 6 are available in Cam Kit (25638-07) Items 8 through 22 are included in Engine Overhaul Gasket Kit (17350-07B) Items 13 and 7 (table 2) are available in Seal Kit (11907), which is included in the Engine Overhaul Gasket Kit.		

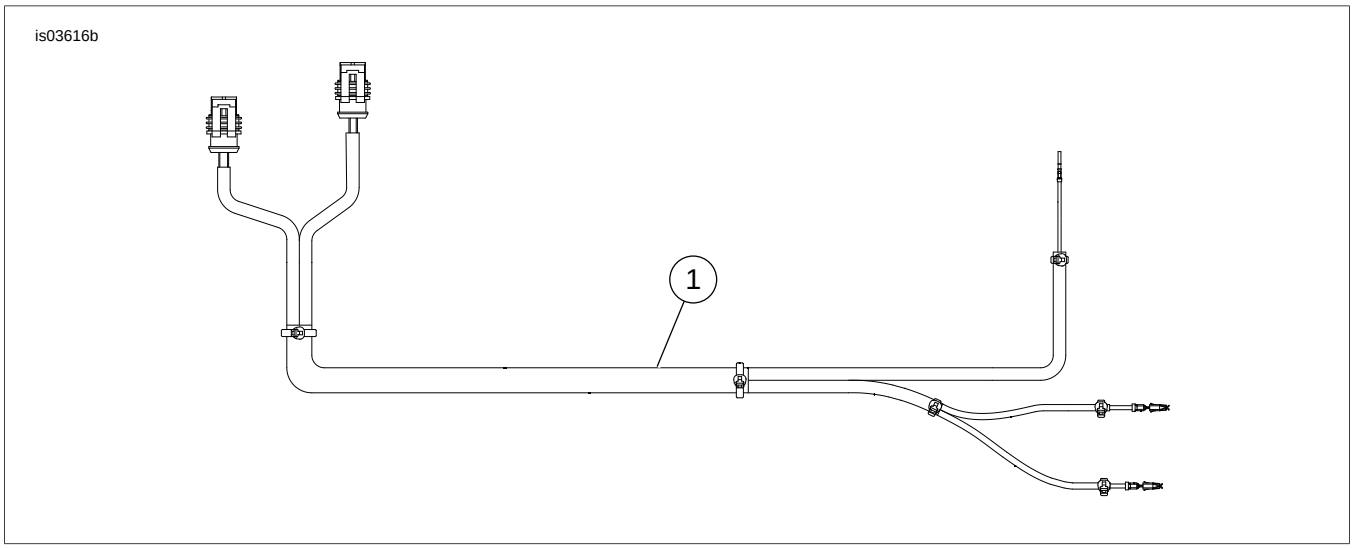


Figure 7. Service Parts: Screamin' Eagle Twin Cam 110 (1800 cc) Conversion Kit

Table 5. Service Parts: Screamin' Eagle Twin Cam 110 (1800 CC) Conversion Kit

Item	Description (Quantity)	Part Number
1	ACR Overlay Wire Harness Kit (Refer to Instruction Sheet J04441)	70623-08